



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public
Agency
and



335502

Memorandum

Date OCT 2 1986

From Acting Director
Office of Health Assessment

Subject Health Consultation, Silver Creek Tailings (SI-86-216)
Park City, Utah

To Mr. Michael McGeehin
Public Health Advisor
EPA Region VIII



EXECUTIVE SUMMARY

The Silver Creek Tailings contain elevated levels of heavy metals. They are uncontained, accessible to the inhabitants of Prospector Square, and a potential source of contamination to ground and surface water in the Park City area. Limited environmental sampling has shown elevated levels of lead, cadmium, and other heavy metals in various media. The Silver Creek Site represents a potential health threat to area residents. The survey of children in the Prospector Square community did not indicate that their blood lead levels were generally elevated when compared to children who lived away from the site. Additional environmental sampling is needed to adequately characterize the site as it relates to public health.

STATEMENT OF THE PROBLEM

The Agency for Toxic Substances and Disease Registry (ATSDR) has been requested by the Environmental Protection Agency (EPA) to review the data provided on Silver Creek Tailings Site, Park City, Utah, and address these questions:

1. Do the data that has been collected at/around this site indicate the possibility of a health threat to the community?
2. Do the data indicate that, from the human health standpoint, additional sampling is required to fully characterize the possible health impacts of the Prospector Square?

BACKGROUND

The Silver Creek Site consists of an estimated 700,000 tons of tailings from mining operations. Mill tailings were first deposited on Prospector Square in the early 1900's by several mining companies. It is thought that some of the tailings were slurried to this area via Silver Creek. Mill tailings were deposited on-site until the 1930's. The tailings cover approximately 80 acres and range in depth from 1 to 10 feet. The site is bordered on the east and south by mountains and on the north and west by valley lowlands. The Silver Creek borders this site on the southeast and often floods its banks in the spring. The area of Park City known as Prospector Square has been constructed on these mine tailings. It was stated in the material reviewed that the tailings were not properly covered and are still exposed in the undeveloped areas of Prospector Square. A population of approximately 10,000 persons live or have businesses on this site (300 persons on the tailings).

The Prospector Square tailings contain elevated levels of heavy metals. They are uncontained, accessible to the inhabitants of Park City, and a potential source of contamination to ground and surface water in the area. Limited environmental sampling has shown elevated levels of lead, cadmium, and other heavy metals in various media.

DOCUMENTS REVIEWED

Memorandum, Mr. Michael McGeehin, Public Health Advisor assigned to Region VIII, to David Forney, Deputy Branch Chief, ATSDR, dated September 3, 1986, re: Silver Creek Tailings Health Consultation.

Memorandum, J. William Geise, Superfund Remedial Branch, EPA, to Michael McGeehin, Public Health Advisor assigned to Region VIII, dated August 28, 1986, re: Health Assessment for Silver Creek Site, Park City, Utah.

Letter, Dale Parker, Ph.D., Division of Environmental Health, Department of Health, Utah, to John Brink, Region VIII EPA, dated April 4, 1984, re: Preliminary Assessment Report, Summit County Tailings, (Prospector Square), Park City, Utah.

EPA Preliminary Assessment Site Information and Assessment containing the laboratory results for soil sampled by the State of Utah.

The documentation for the MITRE scoring process, February 1985.

Site Inspection Report for Prospector Square, Park City, Utah, August 30, 1984, submitted to Region VIII EPA by Utah Division of Environmental Health.

Laboratory values for the Park City Health Study, pre- and post-summer results, (lead and protoporphyrin), 1984, with various study consent forms.

Sampling worksheet and laboratory results for the limited environmental sampling (soil, surface and ground water, indoor dust), EPA Potential Hazardous Waste Site, Site Inspection Report, April 26, 1984.

PRINCIPLE CONTAMINANTS

Lead, cadmium, arsenic.

ENVIRONMENTAL AND EXPOSURE PATHWAYS

The environmental pathways that may contribute to human exposure at this site are windborne and waterborne movement of contaminated soil and dust, and contamination of surface water and groundwater. Potential exposure pathways for area residents include: the ingestion of contaminated soil and dusts, as well as vegetables grown in contaminated soil; the inhalation of contaminated dusts or airborne particulates; the ingestion of contaminated surface or groundwater; direct contact with contaminated

soil; and ingestion of fish from contaminated creeks or other surface water.

Soil and/or Mine Tailings

Lead concentrations in the tailing/soil mixture from Prospector Square ranged from 1170 ppm (12-18 inch depth) to 4000 ppm (upper 2 inches) in the six samples collected by the Utah Geological and Mineral Survey (UGMS) in 1984. Cadmium concentrations in these same soil samples ranged from 43 to 89 ppm. Arsenic levels from 250 to 400 ppm were detected in these surface and subsurface samples. Chromium, mercury, and silver were detected in slightly elevated levels when compared to background soils in the western states. The EP Tox analysis of the tailings showed concentrations of lead at 87 ppm and cadmium at 1.8 ppm (EPA's EP tox limit for lead is 5 ppm and cadmium is 1 ppm).

Surface water

Two surface water samples were collected from Silver Creek, one upstream from the site (lead 5 ppb, cadmium 5 ppb, arsenic 2 ppb) and one from downstream (lead 112 ppb, cadmium 8 ppb, arsenic 6 ppb). Only one analyte, lead, exceeded the Safe Drinking Water Act, Maximum Contaminant Levels (MCL for lead is 50 ppb). Although a slight increase below the site was detected, this limited surface water sampling does not provide an adequate characterization of surface water quality around this site.

Groundwater

No groundwater sampling data was provided in the material reviewed. There is a shallow aquifer (0-10 feet) beneath Prospector Square that could be affected by the tailings. The tailings are porous and leachable according to the material reviewed. Three grab samples from residences or businesses served by the community water distribution system were collected and analyzed for heavy metals. None of the heavy metals were detected above applicable regulations or guidelines. The source for this distribution system was not clear from the material reviewed.

Air

No air sampling data was provided in the material reviewed.

Residential Dust

Seventeen dust samples from the interior of four homes were collected and analyzed for lead, cadmium, and silver. The results of this testing were presented in a handwritten table with no information about collection protocol or quality assurance. Lead concentrations ranged from 8267 ppm from a dining room glass door track, to 307 ppm in carpet dust (mean value 1732 ppm). Concentrations of cadmium ranged from 10 ppm on an interior floor surface, to 794 ppm in window sill dust in a dining room (mean value of 80 ppm). Silver concentrations ranged from 5 ppm to 113 ppm (mean value 28 ppm).

The levels of lead and cadmium detected in these homes were well above what you would expect to find in a residential setting. However, the concentrations of heavy metals in the "control" residence were not provided in the summary table.

BIOLOGICAL TESTING (HEALTH STUDY)

The Utah Department of Health collected blood samples from 39 children potentially exposed in the Prospector Square area of Park City in April 1984. Blood samples were also obtained from nine "comparison" children. Lead determinations found that the average blood lead concentration for the potentially exposed group was 9.5 micrograms per 100 cc of blood, while the comparison group averaged 7.5 micrograms per 100 cc. In October 1984, blood samples were again collected from the potentially exposed group (the average blood lead was 10.5 micrograms per 100 cc) and a comparison group of children (the mean blood lead was 9.5 micrograms per 100 cc). This slight increase between the pre-summer and post-summer blood lead levels in these children were not statistically significant. There were three children that exceeded the Centers for Disease Control guidelines of 25 micrograms per 100 cc of blood lead; levels > 25

micrograms are regarded as "elevated lead" and follow-up is encouraged. An investigation found that one child had other sources of environmental exposure in the home (lead-based paint). The other two children with elevated levels were from the same family and had a garden. Samples from vegetables grown in this garden were found to be contaminated (per telephone conversation with Utah Department of Health). No sampling data were available on garden vegetables. This was the only family that reported having a garden.

There was a general lack of a significant increase in the average blood lead concentrations of Prospector Square children when compared to children who did not live in this community.

ADDRESSING SPECIFIC QUESTIONS: Recommendations

1. The Silver Creek Site represents a potential health threat to area residents. The general lack of a significant increase in the average lead concentrations of Prospector Square children indicates that there appears to be no imminent public health hazard present in Prospector Square. Cadmium is absorbed by plants and may be present at excessive levels in vegetables grown in contaminated soils. Little information is given about gardening in this community, yet this route of exposure may be significant. The lead and cadmium concentrations in indoor dust samples are elevated. If lead levels in soils, dusts, and/or mine tailings are higher than the 500-1000 ppm range and are accessible, the potential for exposure and subsequent adverse health effects remains (Preventing Lead Poisoning in Young Children, CDC, 1985).
2. The limited environmental sampling that has been reported for this site does not adequately characterize all environmental or exposure pathways. Groundwater and surface water need continued monitoring for heavy metals. Sampling leafy as well as root vegetables for cadmium in area gardens is advisable. Further soil/tailing sampling needs to

Page 7 - Mr. Mike McGeehin

define the extent of contamination. Even if attempts have been made by local groups to cover exposed tailings, soil sampling should verify the effectiveness of their efforts.


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